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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/890,445	10/29/2001	Christopher Y Tuan	UNVN.69827	3043

7590 02/25/2004

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EXAMINER	
JEFFERY, JOHN A	

ART UNIT	PAPER NUMBER
3742	10

DATE MAILED: 02/25/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/890,445	Applicant(s) TUAN ET AL.	
	Examiner John A. Jeffery	Art Unit 3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 January 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10 and 14-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *7 and 14-17* is/are allowed.

6)☒ Claim(s) *1-6,8-10 and 18-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

37 CFR § 1.132 Declaration Effective

The declaration under 37 CFR 1.132 filed 1/13/04 is sufficient to overcome the rejection of claims 8-10 and 27-44 based upon the Yehia & Tuan article.

Claim Objections

Claims 22 and 42-44 are objected to because of the following informalities:

Claim 22: In line 1, "alternate" must be changed to "alternating."

Claim 42: In line 4, "to" must be inserted after "directed."

Appropriate correction is required.

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 27 and 28 are rejected under 35 USC 102(b) as being anticipated by Blatchford et al (US 3,679,473). The scope and breadth of the claim language did not preclude the citation of Blatchford et al (US 3,679,473). Blatchford et al (US 3,679,473) discloses a heating system comprising "first layer" 12, "second layer" 13 formed from a cementious composite admixed with an electrically conductive compound, and

intervening thermal insulation layer 11. See Fig. 4, abstract, and col. 1, line 58 - col. 2, line 44. The preamble's recitation that the heating system is "for a bridge deck" in claim 27 merely recites the intended use of the structure and does not further structurally limit the scope of the claim.

Joint Inventors -- Common Ownership Presumed

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103, the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligations under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103.

Claim Rejections - 35 U.S.C. § 103(a)

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.
>
> Subject matter developed by another person, which qualifies as prior art only under subsection (f) and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Claims 1-5, 18, 19, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 3,213,768) in view of CA836117 and further in view of Xie et al (US 5,447,564). Jensen (US 3,213,768) discloses a bridge deck comprising a plurality of concrete slabs 3 in space relation. The slabs are elevated above ground 6 by supports 2. See Fig. 1. See also col. 1, lines 24-27. According to col. 3, lines 12-25, each slab has an electric heating built into its surface coating or disposed immediately under the coating to prevent snow and ice from forming thereon. See also col. 2, lines 1-11. The claims differ from the previously cited prior art in calling for the slabs to be made of a conductive concrete mixture including cement, aggregate, water, and conductive metal fibers and particles. But using electrically conductive concrete as an electric heating means in bridges is conventional and well known in the art as evidenced by CA836117 noting Page 1, line 1 - Page 4, line 4. As explained on Page 1, lines 10-12, using electrically conductive concrete as the heating element enables the heating element itself to support traffic on its surface thus simplifying as well as more uniformly heating the structure. See also Page 3, line 31 - Page 4, line 4. In view of CA836117, it would have been obvious to one of ordinary skill in the art to use electrically conductive concrete as the electric heater in the previously described apparatus to enable the heating element itself to support traffic on its surface thus simplifying the structure as well as more uniformly heating it.

The claims also differ from the previously cited prior art in calling for the conductive materials to include metal fibers and metal particles. But such concrete materials are well known in the art. Xie et al (US5447564), for example, discloses an

electrically conductive concrete mixture comprising cement, aggregates (fine and coarse), water, and conductive materials comprising both metallic fibers (col. 5, line 67 – col. 8, line 13) and metallic particles (col. 6, lines 14-22). The metallic fibers are present in the amount of 0-15% by volume and the metallic particles are present in the amount from 0-80% by volume (i.e., anticipating the claimed fiber and particle ranges in claims 2-4). See abstract. As noted in the abstract, such a composition exhibits excellent electrical conductivity and mechanical strength. In view of Xie et al (US 5,447,564), it would have been obvious to one of ordinary skill in the art to use such a concrete mixture in the previously described apparatus to improve the structure's electrical conductivity and mechanical strength.

Claims 6, 20, 22, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 3,213,768) in view of CA836117, Xie et al (US 5,447,564), and further in view of Minsk (US3573427). The claims differ from the previously cited prior art in calling for the electrodes to be spaced 5-6 feet apart. While CA836117 does not disclose the exact electrode spacing, the selection of electrode spacing to achieve a desired heating effect is an engineering design choice given a desired heating effect and within the level of one of ordinary skill in the art. Because the conductive concrete has a certain electrical resistance per unit length, the spacing of the electrodes necessarily dictates the resulting electrical resistance of the conductive concrete structure, thereby establishing a certain amount of electric heating depending on the applied voltage. Therefore, the choice of electrode spacing to achieve a desired

amount of ohmic heating of the concrete structure would have been within the level of one of ordinary skill in the art – an electrical engineer with at least five years of related industry experience.

Moreover, Minsk (US3573427) teaches in col. 3, lines 50-55 that a spacing of five feet is preferable for a desired voltage gradient. However, Minsk (US3573427) teaches that other spacings are possible spanning from 3-15 feet. Therefore, in view of Minsk (US3573427), it would have been obvious to one of ordinary skill in the art to select a five foot spacing so that a desired heating effect was achieved.

The claims also differ from the previously cited prior art in calling for a power source capable of heating the layer to a temperature greater than 0 degrees C. Energizing electrically conductive concrete to prevent snow and ice accumulation thereon is conventional and well known in the art as evidenced by Minsk (US3573427) noting the abstract. Because ice and snow is prevented from accumulating on the concrete, its temperature is above freezing (i.e., above 0 deg. C).

Regarding claim 20, according to col. 3, lines 5-7 the upper limit of the power dissipation is 40 Watts per square foot (444.4 watts per square meter). Although this power dissipation is outside of the claimed 500-600 watts per sq. meter range, no criticality is seen in the power dissipation being within the claimed range, particularly given the commensurate objectives of both the prior art conductive concrete and the instant invention – namely preventing the accumulation of ice and snow thereon.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 3,213,768) in view of CA836117, Xie et al (US 5,447,564), and further in view of Miller et al (US 5,942,140). The claim differs from the previously cited prior art in calling for a DC power source. But powering electric concrete heaters with either AC or DC is conventional and well known in the art as evidenced by Miller et al (US 5,942,140) noting Fig. 6 and col. 2, lines 45-46. See also col. 4, line 64 - col. 5, line 3. As is known in the art, DC power enables electric heater operation at locations remote from AC mains power sources. In view of Miller et al (US 5,942,140), it would have been obvious to one of ordinary skill in the art to power the heater of the previously described apparatus with DC to enable electric heater operation at locations remote from AC mains power sources.

Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 3,213,768) in view of CA836117, Xie et al (US 5,447,564), Minsk, and further in view of Miller et al (US 5,942,140). The claim differs from the previously cited prior art in calling for a DC power source. But powering electric concrete heaters with either AC or DC is conventional and well known in the art as evidenced by Miller et al (US 5,942,140) noting Fig. 6 and col. 2, lines 45-46. See also col. 4, line 64 - col. 5, line 3. As is known in the art, DC power enables electric heater operation at locations remote from AC mains power sources. In view of Miller et al (US 5,942,140), it would have been obvious to one of ordinary skill in the art to power the heater of the previously

described apparatus with DC to enable electric heater operation at locations remote from AC mains power sources.

Claims 8 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 3,213,768) in view of CA836117, Xie et al (US 5,447,564), and further in view of the Mikio article. The claim differs from the previously cited prior art in calling for a photovoltaic power source. But powering electric heating systems via photovoltaic sources is conventional and well known in the art as evidenced by the Mikio article noting the abstract. Such a source enables the continued availability of an electric heater remote from mains power by utilizing incident solar radiation for power. In view of the Mikio article, it would have been obvious to one of ordinary skill in the art to provide a photovoltaic source in the previously described apparatus to enable the continued availability of an electric heater remote from mains power by utilizing incident solar radiation for power.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 3,213,768) in view of CA836117, Xie et al (US 5,447,564), Minsk, and further in view of the article to Mikio et al entitled "Snow Melting System With Electric Heating Using Photovoltaic Power Generation" ("the Mikio article"). The claim differs from the previously cited prior art in calling for a photovoltaic power source. But powering electric heating systems via photovoltaic sources is conventional and well known in the art as evidenced by the Mikio article noting the abstract. Such a source enables the

continued availability of an electric heater remote from mains power by utilizing incident solar radiation for power. In view of the Mikio article, it would have been obvious to one of ordinary skill in the art to provide a photovoltaic source in the previously described apparatus to enable the continued availability of an electric heater remote from mains power by utilizing incident solar radiation for power.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 3,213,768) in view of CA836117, Xie et al (US 5,447,564), the Mikio article, and further in view of Gali (US 4,871,959). The claims differ from the previously cited prior art in calling for a bank of batteries, an inverter, and a step-up transformer. But such components in solar powered chargers are well known in the art as shown by Gali (US 4,871,959) noting battery 11 charged by the solar panel 12 and inverter 26. See also transformer 29. Such an arrangement provides a means to charge the battery solely from sunlight using readily available components. In view of Gali (US 4,871,959), it would have been obvious to one of ordinary skill in the art to charge a battery using the solar charger of the previously described apparatus to charge the battery solely from sunlight using readily available components.

Claims 27-31, 33, 36, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 3,213,768) in view of CA836117, Xie et al (US 5,447,564), and further in view of Blatchford et al (US 3,679,473). The claims differ from the previously cited prior art in calling for a thermal insulating layer between the

first and second layers. But providing a thermal insulation layer between an upper electric heating layer and a lower support layer in an electrically heated slab is conventional and well known in the art. Blatchford et al (US 3,679,473), for example, discloses a heating system comprising "first layer" 12, "second layer" 13 formed from a cementious composite admixed with an electrically conductive compound, and intervening thermal insulation layer 11. See Fig. 4, abstract, and col. 1, line 58 - col. 2, line 44. The intervening insulation layer not only thermally insulates the support layer, but also imparts strength to the overall structure. In view of Blatchford et al (US 3,679,473), it would have been obvious to one of ordinary skill in the art to provide an intervening thermal insulation layer in the previously described apparatus to layer not only thermally insulate the support layer, but also imparts strength to the overall structure.

Claims 32 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 3,213,768) in view of CA836117, Xie et al (US 5,447,564), Blatchford et al (US 3,679,473), and further in view of Miller et al (US 5,942,140). The claims differ from the previously cited prior art in calling for a DC power source. But powering electric concrete heaters with either AC or DC is conventional and well known in the art as evidenced by Miller et al (US 5,942,140) noting Fig. 6 and col. 2, lines 45-46. See also col. 4, line 64 - col. 5, line 3. As is known in the art, DC power enables electric heater operation at locations remote from AC mains power sources. In view of Miller et al (US 5,942,140), it would have been obvious to one of ordinary skill in the art to power

the heater of the previously described apparatus with DC to enable electric heater operation at locations remote from AC mains power sources.

Claims 34 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 3,213,768) in view of CA836117, Xie et al (US 5,447,564), Blatchford et al (US 3,679,473), and further in view of the Mikio article. The claims differ from the previously cited prior art in calling for a photovoltaic power source. But powering electric heating systems via photovoltaic sources is conventional and well known in the art as evidenced by the Mikio article noting the abstract. Such a source enables the continued availability of an electric heater remote from mains power by utilizing incident solar radiation for power. In view of the Mikio article, it would have been obvious to one of ordinary skill in the art to provide a photovoltaic source in the previously described apparatus to enable the continued availability of an electric heater remote from mains power by utilizing incident solar radiation for power.

Claims 38 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 3,213,768) in view of CA836117, Xie et al (US 5,447,564), and further in view of Nath (US 4,912,742). The claims differ from the previously cited prior art in calling for means for applying RF power for heating. But heating concrete slabs with RF power sources is conventional and well known in the art as evidenced by Nath (US 4,912,742) noting microwave source 12 that provides microwave energy directed to concrete slab 11 to heat the slab. See Figs. 1 and 2 and col. 2, lines 43-64, and col. 4,

lines 5-55. Such a heating technique enables heating the slab either by continuous waves or short energy bursts. See abstract. In view of Nath (US 4,912,742), it would have been obvious to one of ordinary skill in the art to use an RF source to heat the concrete of the previously described apparatus so that the concrete was effectively heated either by continuous waves or short energy bursts.

Claims 39, 43, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jensen (US 3,213,768) in view of CA836117, Xie et al (US 5,447,564), Nath (US 4,912,742), and further in view of Blatchford et al (US 3,679,473). The claims differ from the previously cited prior art in calling for a thermal insulating layer between the first and second layers. But providing a thermal insulation layer between an upper electric heating layer and a lower support layer in an electrically heated slab is conventional and well known in the art. Blatchford et al (US 3,679,473), for example, discloses a heating system comprising "first layer" 12, "second layer" 13 formed from a cementious composite admixed with an electrically conductive compound, and intervening thermal insulation layer 11. See Fig. 4, abstract, and col. 1, line 58 - col. 2, line 44. The intervening insulation layer not only thermally insulates the support layer, but also imparts strength to the overall structure. In view of Blatchford et al (US 3,679,473), it would have been obvious to one of ordinary skill in the art to provide an intervening thermal insulation layer in the previously described apparatus to layer not only thermally insulate the support layer, but also imparts strength to the overall structure.

Claim Rejections - 35 USC § 102 or 103(a)

Claim 45 is rejected under 35 U.S.C. 102(b) as being anticipated by Rau (US1473047) or, in the alternative, under 35 U.S.C. 103(a) as being obvious over Rau (US1473047). Rau (US1473047) discloses an insulating material comprising 60% plaster Paris (mortar) and 7% sawdust. Although Rau does not expressly state the percentages are by volume, such relative volume percentages would be inherent to Rau. If such inherency is disputed, then it would have been obvious to one of ordinary skill in the art to interpret the percentages recited by Rau as volume percentages, particularly in view of the relative densities of the mortar as compared to sawdust, as well as the relatively stable volumes of the respective materials at differing temperatures.

Allowable Subject Matter

Claims 7 and 14-17 are allowable over the art of record.

Other Pertinent Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Applicant should (1) separately consider the art, and (2) consider the art together with the previously cited prior art for potential applicability under 35 U.S.C. §§ 102 or 103 when responding to this action. US 506 discloses a heated bridge deck. US 555 discloses a bridge deck with interchangeable concrete panels. US 580

discloses a thermal walkway with plurality of heated slabs placed adjacent each other in Figs. 4-6. US 348 discloses using RF energy to thaw frozen structures exposed to the environment.

Response to Arguments

Applicant's arguments have been considered but are deemed to be moot in view of the new grounds of rejection. Regarding claim 45, the examiner maintains that Rau amply teaches and suggests the claimed mixture; the rejection is proper.

Final Rejection

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

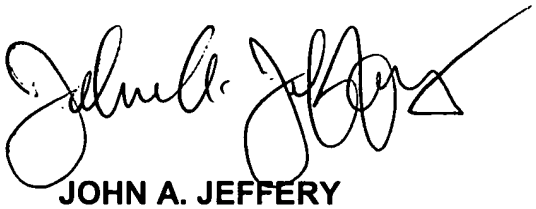
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John A. Jeffery whose telephone number is (703) 306-4601. The examiner can normally be reached on Monday - Thursday from 7:00 AM to 4:30 PM. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ehud Gartenberg, can be reached on (703) 308-2634. All faxes should be sent to the centralized fax number at (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1148.



JOHN A. JEFFERY
PRIMARY EXAMINER

2/23/04